

strongly striate above, smoother and very glossy below, *not malleated*, or with only slight traces of malleation. Color dark raw umber or passing into dark olive, with a conspicuous dark chocolate band above the periphery, bordered with ecru-olive. Sutural line citron yellow. First four whorls russet or sometimes salmon-buff. Columellar lip spreads and is adnate over the umbilicus.

Alt. 24, diam. 32 mm.

Alt. 21.5, diam. 28.3 mm.

Santee, 18 miles from San Diego, California, collected by the late Mr. C. W. Gripp. Figured cotypes and eight others are No. 105300 A. N. S. P.

This very handsome snail is probably most nearly related to *E. t. binneyi* Hemph. which was described from a single specimen. It is known to me by one "dead" shell from Murphy's Canyon Mission Valley, San Diego Co., identified by Mr. Hemphill and given me by Doctor Fred Baker. *E. t. binneyi* is less globose than *grippi*, lighter colored, with no band.

NOTES ON SOME OREOHELICES FROM WYOMING.

BY HENRY A. PILSBRY.

The material giving occasion for these notes was collected by Mr. Don W. Walker in the vicinity of Shell, Big Horn Co., in northern Wyoming, for Mr. Junius Henderson, Curator of the University Museum at Boulder, Colo. We are indebted to Mr. Henderson for the opportunity of studying the shells, and for various notes bearing upon them, in part quoted below.

OREOHELIX YAVAPAI EXTREMITATIS Pilsbry & Ferriss.

Shell Creek Canyon, 10 miles northeast of Shell, Wyo., with *O. cooperi* and *O. pygmaea*, see below. Dry Gulch $2\frac{1}{2}$ miles east and 3 miles north of Shell, a dry place without timber, only a few bushes; dead weathered shells, strongly keeled. White Creek Canyon, 8 miles east of Shell, in very damp pine forest, only dead shells found. Trapper's Creek 7 miles east of Shell, about 4 miles south of White Creek Canyon, dead shells only.

This is a carinated form which differs from *O. hemphilli* (Newc.) by being less excavated above and below the peripheral keel, the

last whorl far less swollen above. In *O. hemphilli* all post embryonic whorls are more convex above. Moreover, *O. hemphilli*, according to Mr. Binney, has well-developed side-cusps on central and lateral teeth. These are entirely wanting in *O. yavapai* and its varieties, in numerous specimens I have examined, including some from Shell Creek Canyon.

The Oreohelices are divisible into two groups by certain peculiarities of the soft anatomy. One of these groups has hitherto been found only in Arizona, and comprised *O. barbata* of the Chiricahua Mts., and *O. yavapai* of central Arizona and New Mexico, with several subspecies in the Grand Canyon.¹ *O. y. extremitatis* lives just below the rim of the Canyon. On comparison with the specimens from Wyoming, no tangible difference, either in the shell or the soft anatomy could be found. Both vary somewhat in the prominence of the peripheral keel, but in the Wyoming specimens it is usually a trifle more prominent than in the average *extremitatis* from Arizona, the most strongly keeled "subfossil" shells reminding one of *O. chiricahuana*. On comparing a large number the difference is minimized, selected *extremitatis* from the type locality having the keel as strong as in any of the Wyoming lot.

The extension of this form northward is unexpected, the whole width of Utah and Colorado as well as most of Wyoming lying between its northern and southern areas. Mr. Henderson writes:

"I suppose little is yet really known of the molluscan fauna of the region intervening between the Grand Canyon and Wyoming. I find but little published literature on Wyoming shells, and do not know of much collecting having been done in eastern Utah or western Colorado. It is true that at present there are great stretches of country unfavorable to land snails in that region, and equally true that semi-arid conditions have prevailed in the southwest for a long time—probably since Pliocene time. Nevertheless, there are several reasons for believing that during that long period of semi-aridity there has been more or less fluctuation within narrow limits. During each cycle of increased moisture favorable conditions would reach greater extent, and if the snails spread with the increase of favorable territory, there would be small areas where they could obtain a

¹ See "Mollusca of the Southwestern States V," 1911, where the Oreohelices of the Grand Canyon are figured.

foothold and continue to thrive locally until the next cycle of moisture, and thus in a few hundred years, perhaps extend their range a long way, and in a few thousand years cross a State or two. I have some interesting mollusk records bearing upon the question of such fluctuations, not yet published. So the mere fact of intervening distance is not a fatal objection to considering the Wyoming shells identical with the Grand Canyon form, if you do not think the difference in the keel is sufficient to separate them, of which I am doubtful myself. * * * * Professor Cockerell was just in the Museum and we went over the *extremitatis* material together, and conclude that in the uneroded shells there is no essential difference between the Wyoming specimens and those from the Grand Canyon, so I am labelling them all *extremitatis*."¹

OREOHELIX COOPERI (W. G. B.).

Trapper's Creek, 7 miles east of Shell, White Creek Canyon. Shell Creek Canyon, 10 miles northeast of Shell. 2 miles south of Anchor on the north slope of mountain at its foot, among pines and underbrush, on Owl Creek. This place is about 60 miles south of Shell Creek.

OREOHELIX PYGMÆA n. sp. Plate III, figs. 10, 11, 12.

The shell is related to *O. cooperi*, from which it differs in being smaller, with a narrower umbilicus, *much more convex whorls*, and *rougher sculpture*. The spire is convexly conic. Embryonic two whorls moderately convex, finely and weakly striate, with a few distinct spirals on the latter part near the periphery. Post embryonic whorls increase very slowly and are *very convex*, the convexity greater above the middle of each, with sculpture of *strong, irregular wrinkles* along growth-lines and moderate or very weak spiral impressed lines. On the last whorl, which is very convex throughout, the sculpture is strongest above, but continues upon the base. Suture deeply impressed. Umbilicus small, its width contained five to six times in that of the shell. Peristome thin, forming $\frac{3}{4}$ to $\frac{4}{5}$ of a circle. The spire is flesh-colored when worn, fleshy-brown with whitish streaks in young shells; the last 1 or $1\frac{1}{2}$ whorls are impure white with fleshy streaks; marked with a deep brown band below the

¹Junius Henderson in letter, Nov. 15, 1912.

periphery, and usually several narrower bands above it and on the base.

Alt. 8.7, diam. 11 mm., whorls 5.

Alt. 7, diam. 9.7 mm., whorls 4 $\frac{3}{4}$.

Alt. 7, diam. 9.3 mm.

Alt. 8, diam. 9 mm.

Shell Creek Canyon, 10 miles northeast of Shell, Wyoming, type and cotypes no. 106977 A. N. S. P., also 106979 A. N. S. P. (dead shells from type loc.). Also in coll. University of Colorado. It was found also in White Creek Canyon, 8 miles east of Shell, in very damp pine forest. Collected by Don W. Walker.

"Mr. Walker, who collected the Wyoming material, says the Shell Creek *pygmæa* and *cooperi* were found together on a steep slope on the south side of the canyon, where they occurred in great numbers, more of the small ones below and more of the *cooperi* above" (Henderson). It was found with *O. cooperi* also in White Creek Canyon.

This snail is exactly intermediate between *O. cooperi* (W. G. B.) and *O. peripherica* (Ancey). The irregular costulæ or wrinkles are stronger than in the first, but weaker and less regular than in *O. peripherica*. Further collections in Wyoming may show that *O. pygmæa* connects with one or the other of these species, but at present it seems best to rank it as a distinct species, since this course is more likely to insure critical examination into its status by those who may secure further material. Moreover, its occurrence in company with *O. cooperi* disposes of the hypothesis that *pygmæa* is a stunted or unfavorable-station form of *cooperi*—an idea which I would otherwise have been inclined to harbor. It is readily distinguishable from young or small *cooperi* by the *far greater convexity* of the whorls of the spire, as well as by the sculpture. As I have seen a great number of *O. cooperi* from many places, it does not seem likely that intergrading forms occur.

O. cooperi minor (Ckll.) is a larger form than *pygmæa*, having less convex whorls, and the other characters of *cooperi*, of which it is, as the name implies, merely a somewhat diminutive race. Specimens from Mr. Henderson, taken at McCoy, Colo., and identified by Professor Cockerell as his var. *minor*, have been compared.

O. peripherica (Anc.) is the prior specific name to include the series of local races described as var. *binneyi*, *newcombi*, *multicostata*,

gouldi, *albofasciata* and *castaneus* Hemphill,¹ all of northeastern Utah. So far as specimens now known to us give evidence, these local forms taken together constitute a species distinct from *O. idahoensis* (Newc.). No real intergrades between *peripherica* and *idahoensis* have yet been found, whatever may exist still uncaught in the territory intervening between their respective areas.

MOLLUSCA FROM WYOMING CO., N. Y.

BY FRANK C. BAKER.

A few years ago the writer spent a week's vacation in Wyoming County, N. Y., and incidently gathered a few shells as opportunity offered.

Banks of Genesee River, near Portage, under bark of dead tree trunk :

Zonitoides arborea (Say).

Gastrodonta ligera (Say).

Pyramidula cronkhitei anthonyi Pilsbry.

Cochlicopa lubrica (Müll.).

In running brook by roadside :

Galba umbilicata (C. B. Adams).

Farm of John Smallwood, near Warsaw, swamp in bottom land :

Galba palustris (Müll.).

Physa gyrina (Say).

Swales in upland woods :

Zonitoides arborea (Say).

Pyramidula cronkhitei anthonyi Pilsbry.

Succinea avara Say.

Physa gyrina Say.

Aplexa hypnorum (Linné).

Segmentina armigera (Say).

Galba palustris (Müll.).

Galba obrussa (Say).

Galba umbilicata (C. B. Adams).

Sphærium occidentale Prime.

¹ See Second Supplement to Terr. Moll. V, pp. 29-32.